JOSHUA J. TURNER

CONDENSED MATTER AND MATERIAL SCIENCE DEPT.
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EDUCATION

Doctor of Philosophy Degree in Physics 2003–2007 (expected Oct.)

University of Oregon • Eugene, OR

Thesis: "Probing Complex Ordering in Colossal Magnetoresistive Transition-metal Oxides Using Coherent Resonant Soft X-ray Scattering"

Advisor: Prof. Stephen D. Kevan

Master of Arts Degree in Physics 2001-2002

Boston University • Boston, MA

Bachelor of Science Degree in Mathematics 1997-2001

University of California, Santa Barbara • Santa Barbara, CA

Bachelor of Arts Degree in Physics 1997-2001

University of California, Santa Barbara • Santa Barbara, CA

RESEARCH INTERESTS

- Coherent scattering techniques applied to dynamics, metrology, and imaging
- Complex and non-ergodic systems
- Highly correlated electron physics, orbital ordering, and transition-metal oxides
- Detector development
- Nanomagnetism and low dimensional magnetic systems
- Computational methods in analysis

RESEARCH ACCOMPLISHMENTS

- First coherent soft x-ray scattering from a transition-metal oxide system
- First measurement of orbital ordering domain dynamics
- Development of generalized speckle analysis
- Construction/commissioning of new endstation and beamline 12.0.2.2 at ALS
- Pioneering experiments in coherent *magnetic* scattering with soft x-rays

RESEARCH EXPERIENCE

July 2006 – Present: *Condensed Matter Physics and Material Science Dept., Brookhaven National Laboratory, Visiting Jr. Scientist*

- Microdiffraction and x-ray diffraction at National Synchrotron Light Source

Sept. 2005 – July 2006: *ALS, Lawrence Berkeley National Laboratory, Research Associate*

- Expertise in applying coherence soft x-rays to the study of resonant, magnetic scattering for magnetic films and oxides in reflection and transmission geometries
- Detector development and design
- Spatial filter pinhole fabrication and sample preparation
- Focused Ion Beam (FIB) etching and Scanning Electron Microscope (SEM) imaging at the National Center for Electron Microscopy facility
- Beamline alignment and diagnostics
- User support for beamline/endstation
- Speckle analysis in Linux-based IRAF

Dec. 2002 – Sept. 2004: *Scientific Support Group at ALS, Lawrence Berkeley National Laboratory, Research Associate*

- Construction and commissioning of the Coherent Scattering Beamline 12.0.2.2
- Coherent scattering chamber magnet calibration and characterization
- Laser calibration of piezoelectric modules
- Detector design and development

May 2002 – Aug. 2004: *ALS, Lawrence Berkeley Laboratory, Summer Research Internship. Advisor: Dr. Elke Arenholz*

- Performed magnetic field analytic calculations for vector magnetometer, an octapole electromagnet now stationed on beamline 4.0.2 at the ALS for magnetic spectroscopy measurements and circular/linear dichroism.
- Wrote an algorithm to handle non-linearity of ferromagnetic poles in field distribution.

2000 – 2001: *Mathematics Dept., University of California, Santa Barbara. Advisor: Prof. Thomas Sideris*

- Independent research in partial differential equations, investigations in elasticity, fluid mechanics, stress waves, and theoretical quantum physics.

2000 – 2001: *Physics Dept., University of California, Santa Barbara. Advisor: Prof. Phillip Lubin*

- Astrophysical research for measuring the polarization of the Cosmic Microwave Background Radiation.
- Microwave telescope physics and interferometric techniques, attenuator design, cryogenics, instrumentation design, machining, and mechanical fabrication.

1998 – 2000: *ALS, Lawrence Berkeley Lab - Summer Research Advisor: Dr. Scot Kellar and Prof. Z. X. Shen*

- Electron-beam heater design, assessment, and testing, evaporator fabrication and analysis, mutual inductance probe design, assembly, and evaluation.

FELLOWSHIPS AND SOCIETIES

- ALS Doctoral Fellowship 2003-2004
- American Physical Society member
- Material Research Society member

TALKS AND POSTERS

June 2007: "Orbital Ordering Domain Dynamics in CMR Oxides" - Coherence 2007 International Workshop at the Asilomar Pacific Grove, CA *(poster)*

May 2007: "Spatiotemporal Dynamics in the Orbital Ordering Transition of PCMO" - Stony Brook University Stony Brook, NY *(talk)*

March 2007: "Stationarity and Spatiotemporal Dynamics in Manganites" - APS Meeting Denver, CO *(talk)*

Nov. 2006: "Coherent Scattering from Manganites" - Advanced Light Source Users Meeting Berkeley, CA *(poster)*

Sept. 2004: "Coherent Scattering from Strongly Correlated Electron Systems in Transition Metal Oxide Systems" - Advanced Light Source Seminar Berkeley, CA *(talk)*

TEACHING EXPERIENCE

2004 – 2005: *University of Oregon, Physics Dept. - Teaching Assistant*
Energy and the Environment. Astronomy.
Discussion sections.

2002: *Boston University, Physics Dept. - Teaching Fellow*
Modern Physics (for physics majors). Non-classical Physics (for engineering).
Lectures, discussion sessions, and labs.

2001: *Boston University, School of Arts and Science - Teaching Fellow*
Basic Physics laboratory (for non-science majors).
Labs and discussion sections.

2000-2001: *University of California, Santa Barbara, Physics Dept. - Teaching Assistant*
Optics and Modern Physics for physics majors and engineering.
Discussion sections and laboratory. Review session lectures.

PUBLICATIONS

J. J. Turner, K. J. Thomas, J. P. Hill, M. Pfeifer, K. Chesnel, Y. Tomioka, Y. Tokura, and S. D. Kevan, "Domain dynamics in a doped manganite" (submitted to Nature Physics).

K. Chesnel, **J. J. Turner**, M. Pfeifer, S. D. Kevan, "Probing Complex Materials with Coherent Soft X-rays" (submitted to Applied Physics A).

M. S. Pierce, C. R. Buechler, L. B. Sorenson, **J. J. Turner**, S. D. Kevan, E. A. Jagla, J. M. Deutsch, T. Mai, O. Narayan, J. E. Davies, K. Liu, J. H. Dunn, K. M. Chesnel, J. B. Kortright, O. Hellwig, and E. E. Fullerton, "Disorder-induced microscopic magnetic memory" *Phys. Rev. Lett.* 94, 017202 (2005).

J. J. Turner, K. J. Thomas, J. P. Hill, K. Seu, M. Pfeifer, K. Chesnel, Y. Tomioka, Y. Tokura, and S. D. Kevan "Time-dependent Heterogeneity in $Pr_{0.5}Ca_{0.5}MnO_3$" (in preparation).

J. J. Turner and S. D. Kevan "Fourier Techniques for Contrast-independent Speckle Correlation Analysis used in Soft X-ray Resonant Metrology Experiments" (in preparation).

REFERENCES

Dr. Stephen Kevan, Professor of Physics, Dept. Chair
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Berkeley, California 94720
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Dr. John P. Hill, X-ray Scattering Group Leader
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